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CONTENTS:

Variations of American Cranberries. <i>M. L. Fernald</i> . . .	231
Bryophytes of the Mt. Greylock Region, — II. <i>A. L. Andrews</i> . . .	238
Remarkable Persistence of the Button-bush. <i>W. Deane</i> . . .	243
Cristate Form of <i>Nephrodium marginale</i> . <i>F. G. Floyd</i> . . .	244
Rare Plants in Centreville, Massachusetts. <i>C. I. Cheney</i> . . .	245
Some Ferns of Franklin County, Maine. <i>H. W. Jewell</i> . . .	247
<i>Cuphea procumbens</i> at Andover, Mass. <i>M. E. Gutterson</i> . . .	247
<i>Erodium moschatum</i> in Connecticut. <i>H. S. Clark</i> . . .	248
An American Occurrence of <i>Centaurea diffusa</i> . <i>R. L. Mann</i> . . .	249
Two New Stations for <i>Arceuthobium</i> . <i>A. S. Pease</i> . . .	249
Some Species of <i>Crepis</i> and <i>Leontodon</i> . <i>C. H. Bissell</i> . . .	249
Errata	250
Index	251

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THE VARIATIONS AND DISTRIBUTION OF AMERICAN CRANBERRIES.

M. L. FERNALD.

(Plate 40.)

THE AMERICAN VARIETY OF *VACCINIUM VITIS-IDAEA*.

THE Mountain or Rock Cranberry abounds on the eastern coast and on the mountains of New England where it has long been familiar to botanists and where, either from its lustrous box-like foliage, its delicate rose-pink flowers, or its clusters of tart dark red berries so often gathered for sauce and pies, it is better known than are most of our plants to the non-botanical visitor. The plant has long prostrate stems which creep and freely root in the crevices of rocks or in damp carpets of moss, and from which spring the densely leafy branches. On bare slopes and dry plains the branches are very short and often prostrate, and the plant forms close mats rising only 3 or 4 centimeters above the surface of the ground. In more favorable situations, as the mossy crests of headlands and cliffs, the plant is of looser habit and the branches, rising through the moss, are sub-erect and 8 or 10 (very rarely even 15 or 20) centimeters long. The oblong-obovate lustrous leaves are very thick and coriaceous like those of the box, with strongly revolute margins, and they vary in size from 0.5 to 1.8 cm. long and 4 to 9 mm. broad. The flowers in terminal clusters are bright rose-pink or tinged with deep red.

This little evergreen shrub ordinarily only a few centimeters high, with leaves usually about a centimeter long and with bright rose or red-tinged flowers, occurs throughout arctic America, extending south to the mountains of Maine, New Hampshire and Vermont, the

coast of Cape Ann, Massachusetts, the Great Lakes, and British Columbia. It occurs also on the islands of Behring Sea, and from Kamtschatka to Japan, in Greenland, and very locally on the mountains of Europe.

True *Vaccinium Vitis-Idaea*, the *Preisselbeere* of Germany, *Cowberry* of England, *Lingonris* of Sweden, and *Tyttebaer* of Denmark and Norway, is a much larger plant than our Mountain Cranberry, the branches sometimes 2 to 2.5 dm. (8 to 10 inches) high, the thinner leaves 1.5 to 2.7 cm. long, 7 to 16 mm. broad; and the flowers are white or pale pink.

By European authors the differences between this typical large-leaved form and the small-leaved variety have often been noted, but by American students these distinctive points have been very generally overlooked. In fact, Dr. Gray, following the then established precedent of treating the European and American plants as one, seems to have drawn his description from European specimens for in the first edition of the Manual (1848) the plant is described as "6'-10' high," a stature double that ordinarily reached by the American form. This statement of the height has been repeated unchallenged in the later editions of the Manual, though altered by Dr. Gray in the Synoptical Flora to the more satisfactory "3 inches to a span or more high," thus covering the average height of the American and the extreme height of the European forms. In the most recent exhaustive treatment of the genus *Vaccinium*, however, the traditional statement "Plants low (6-10 inches)"¹ occurs. Thus for more than a half century, in spite of the modification to "3 inches" made by Dr. Gray in 1878, the unfortunate "6-10 inches" has been forced to serve as an unattainable goal for the lowly plant of our mountains and coast.

Pursh alone among those who have specially commented on the two extremes has said, "The American plant is more robust than the European, and the leaves are considerably larger,"² a statement which, in view of the facts, seems quite reversed from the meaning probably intended by its author. By others, however, the larger plant has been consistently treated as the normal and common form

¹ Munson, Me. Agr. Expt. Sta. Bull. No. 76, 138 (1901), and in Bailey, Cyc. Am. Hort. 1892 (1902).

² Pursh, Fl. 289 (1814).

of Europe, while the infrequent occurrence of the dwarf form on the mountains of northern Europe has been considered worthy of special comment. Thus in 1821 Sir William Hooker in his *Flora Scotica* (118) said "A dwarf variety, very bushy, with leaves much crowded, and only half the size of the common plant, but having flowers full as large, is found by *Mr. Murray* on the Campsie hills, near Glasgow, and on hills in Arran. This retains its characters in the gardens, where in England it has been long known under the name of *V. buxifolium*." ¹

In 1825 an excellent plate of the dwarf plant was published by Loddiges as *Vaccinium Vitis-Idaea minor*, "a very pretty variety of the *Vitis-idaea*: it is a native of the north of Europe and America, and is a low evergreen shrub, growing not more than four or five inches in height, and flowering with us [in England] in May and June." ² The varietal name *minor*, applied by Loddiges to the small American plant, was obviously in contradistinction to his *Vaccinium Vitis-Idaea major* "which grows in many of the northern parts of Europe," and which he had previously illustrated. ³

Early in the last century Chamisso, botanist to the Romanzoff expedition, collected in Kamtschatka and on the island of Unalaska the small form characteristic of North America, and soon thereafter Mertens collected the same plant at Sitka. A specimen of the Unalaska plant in the Gray Herbarium is labelled in the handwriting of Chamisso "*Vaccinium Vitis-Idaea* L. var.," and in commenting upon the plant its collector compared its small foliage with that of the Greenland form of the species: "Parvitate foliorum cum specimenibus groenlandicis convenit." ⁴ The Mertens specimens collected at Sitka were likewise distributed as an unnamed variety, while Bongard who critically studied them emphasized their divergence from the European type: "Foliorum parvitate ab europaea planta recedens." ⁵

At about the same time Ernst Meyer identified ⁶ the American plant with the small form mentioned by Hooker as *Vaccinium*

¹ Possibly *V. buxifolium*, Gilib. Fl. Lituan. i. 4 (1781), which is referred by European authors to *V. Vitis-Idaea*.

² Loddiges, Bot. Cab. xi. no. 1023 (1825).

³ Loddiges, l. c. vii. no. 616 (1822). ⁴ Cham. & Schl. Linnaea, i. 526 (1826).

⁵ Bongard, St. Pétersb. Acad. Sci. Mém. ii. 152 (1832).

⁶ E. Meyer, Pl. Labr. 55 (1830).

buxifolium from the Scotch Highlands; and in 1837 Hornemann described the small plant of Greenland as *V. Vitis-Idaea*, var. *pumilum*.¹ Under this name the Greenland plant has since been known to the Danish botanists, and it was described by Lange and beautifully illustrated in *Flora Danica* (xvii. t. 2960). More recently Lange has recognized in Labrador material the Greenland plant, but at the same time he considered the American plants in the main identical with the European: "Hovedformen i Nord-Amerika, Sibirien, hele Europa."²

Thus by different European authors the plant of Alaska and of Labrador has been distinguished from the commoner form of the plant in Europe and identified with var. *pumilum* of Greenland and the local plant described by Hooker from the Scotch Highlands, while by Loddiges as early as 1825 the American form was distinguished as var. *minor*. In a large series of American material the writer has been unable to find any specimens which can be satisfactorily identified with the large-leaved plant of Europe. All the American material agrees, however, with the Greenland and Alaska plants and these are well represented by the plate of var. *minor*, Loddiges. Under this name, then, the American plant should be known.

The more important bibliography of the dwarf small-leaved form is as follows:

VACCINIUM VITIS-IDAEA, L., var. MINOR, Loddiges, Bot. Cab. xi. no. 1023 (1825). *V. Vitis-Idaea*, American authors. *V. buxifolium*, Hook. Fl. Scot. 119 (1821). *V. Vitis-Idaea*, var., Cham. & Schl. Linnaea, i. 526 (1826); Bongard, St. Pétersb. Acad. Sci. Mém. ii. 152 (1832). *V. Vitis-Idaea*, var. *pumilum*, Hornem. Oec. Pl. ii. 177 (1837); Lange, Fl. Dan. xvii. t. 2960, and Fl. Groenl. 90. *V. Vitis-Idaea*, var. *microphyllum*, Herder, Acta Hort. Petrop. i. 313 (1872). *Vitis-Idaea Vitis-Idaea*, Britton, Man. 706 (1901), as to American plant.

VACCINIUM OXYCOCCUS AND MACROCARPON.

The Large Cranberry, *Vaccinium macrocarpon*, the common species of coastal bogs in eastern America, is readily distinguished in

¹ Horn. Oec. Pl. i. 177 (1837). ² Lange, Fl. Groenl. 90. (1880).

its characteristic form from the Small Cranberry, *V. Oxycoccus*. Usually *V. macrocarpon* is a coarser plant with larger obtuse veiny leaves which are pale but not whitened beneath and with very slightly revolute margin, and the pedicels of the larger flowers and fruits are produced upon an elongated rachis from the tip of which arises a leafy shoot. *V. Oxycoccus* on the other hand, in its typical form, has almost capillary stems, and the leaves are smaller than in *V. macrocarpon*, whitened beneath and so conspicuously revolute above the middle as to produce a narrow triangular acute-tipped outline. The flowers and fruits are smaller than in *V. macrocarpon* and the pedicels ordinarily arise from a very short terminal axis or rachis, although in rare individuals the rachis is elongated and proliferous as in *V. macrocarpon*. The flowers of the two species also present differential characters, the larger flowers of *V. macrocarpon* having the anthers proportionately longer than in smaller flowers of *V. Oxycoccus*.

But although the typical forms of *Vaccinium macrocarpon* and *V. Oxycoccus* are clearly enough distinguished by their ordinarily defined characters, a third plant of New England has proved more puzzling. *V. macrocarpon* is confined for the most part to grassy swamps or sandy bogs of the coastal plain or to wet shores at low altitudes inland, while *V. Oxycoccus*, at least in New England and eastern Canada, is a plant of cold sphagnum bogs or of humus. The third cranberry which has recently attracted the attention of New England botanists grows like *V. Oxycoccus* in sphagnum bogs, but superficially it seems exactly intermediate between that and the larger species of the warmer swamps. The stems are quite as coarse as in small plants of *V. macrocarpon*, the leaves, much larger than in *V. Oxycoccus*, are only slightly revolute and often quite obtuse at tip, the flowers and fruit are larger, though small for *V. macrocarpon*, and the rachis shows a decided tendency to proliferation.¹

On account of its somewhat intermediate characters this larger plant of the New England sphagnum bogs has been thought to represent a transition between the two well-known species, or perhaps to be of hybrid origin. The latter origin of the plant is, however, quite improbable since in northern Maine it is abundant in swamps far outside the range of *V. macrocarpon*, and, furthermore, the intermediate plant is exactly matched by material from eastern Asia and

¹ Of 64 inflorescences examined, 27 (or .42) show more or less proliferation, of 90 inflorescences of *V. Oxycoccus* 18 (or .20) show proliferation, while of 140 inflorescences of *V. macrocarpon* 132 (or .94) exhibit this characteristic.

northwestern America where no *V. macrocarpon* is known to occur. This Pacific coast form, nevertheless, was taken by Sir William Hooker for the larger eastern species for he states¹ that at the mouth of the Columbia *V. macrocarpon* is very abundant. Later, however, Dr. Gray in studying the *Vacciniums* considered the Pacific slope cranberry best treated as a large variety of *V. Oxycoccus*.

The material now at hand shows that this intermediate form, *V. Oxycoccus*, var. *intermedium*, Gray, is not confined to northwestern America and eastern Asia as originally supposed by Dr. Gray, but that as already stated it is in the upland bogs of New England. In fact many specimens previously referred on account of their size to *V. macrocarpon* have the more pointed foliage and the characters of inflorescence of *V. Oxycoccus*, var. *intermedium*. To this form belongs the Saskatchewan material of Bourgeau formerly referred to *V. macrocarpon*, a species which apparently reaches inland only to the Great Lakes.

The characters — size of plant, size and outline of leaf, size of flower and fruit and proliferation of the flowering rachis — ordinarily relied upon to separate the circumboreal *Vaccinium Oxycoccus* and the strictly American *V. macrocarpon* are so mingled in *V. Oxycoccus*, var. *intermedium* as to render their use as final criteria too misleading. But another character apparently overlooked by students of the group very materially reinforces the traditional ones. In *V. macrocarpon*, with the flowers borne on a proliferous rachis, the pedicels bear, usually toward their tips, a pair of subapproximate leaf-like bracts. Ordinarily these bracts are 4 or 5 mm. long, green and of firm texture, but occasionally they become nearly or quite twice that size. In the smaller *V. Oxycoccus*, with the flowers on a short terminal rachis which is rarely proliferous, the pedicels bear, usually near or below their middle, a pair of lanceolate or lance-ovate often strongly involute colored bracts 1 to 2.5 mm. long. In the larger plant of the northwest, now found to occur likewise in the east, the bracts are exactly those of *V. Oxycoccus*, and, in view of its leaves with more whitened under surface, its ordinarily terminal inflorescence and its range, it is undoubtedly a very large development of *V. Oxycoccus*.

The three true Cranberries may be readily recognized by the following characters:

¹ Hook. Fl. Bor.-Am. ii. 35.

V. *OXYCOCCUS*, L. Sp. 351 (1753).—Stems slender, creeping, the branches almost capillary, erect or ascending: leaves oblong or oval, 3 to 8 mm. long, 1 to 3 mm. broad, strongly revolute, becoming narrowly triangular in outline, conspicuously whitened beneath: pedicels 1 to 4, capillary, from a terminal (rarely proliferating) short rachis (at most 3 or 4 mm. long), bearing near or below the middle 2 lanceolate or lance-ovate often involute colored bracts: corolla-segments 5 to 6 mm. long: berry 6 to 8 mm. in diameter.—In sphagnum and wet humus, boreal regions generally, coming south in America to Pennsylvania, Michigan and Wisconsin.

Var. *INTERMEDIUM*, Gray, Syn. Fl. ii. pt. 1, ed. 2, 396 (1886).—Coarser: leaves 6.5 to 15 mm. long, 3 to 6.5 mm. broad, acute or obtuse, only slightly revolute: pedicels 2 to 10, from a longer (often 5 to 10 mm. long) rachis: corolla-segments 6 to 8 mm. long: berry 8 to 10 mm. in diameter.—Japan, Sachalin Isl., etc.; Maine to British Columbia, south in the mountains to North Carolina and to Lake Superior and Oregon. The following eastern specimens have been examined:—MAINE, Ft. Kent, no. 2416; Blaine, no. 2417; Orono (*Fernald*): VERMONT, Colchester (*Oakes*); Willoughby (*Kennedy*): CONNECTICUT, without locality—probably Norfolk (*Robbins*): NEW YORK, western section (*Gray*): NORTH CAROLINA, without locality (*Croom*): ONTARIO, Pic River, Lake Superior (*Loring*): SASKATCHEWAN, without locality (*Bourgeau*).

V. *MACROCARPON*, Ait. Hort. Kew. ii. 13, t. 7 (1789).—Stems comparatively stout: leaves oblong-elliptic, blunt or rounded at the tip, 6 to 17 mm. long, 2 to 8 mm. broad, pale or somewhat whitened beneath, flat or very slightly revolute: pedicels 1 to 10, from an elongated (1 to 3 cm. long) proliferating rachis, bearing toward the tip 2 flat leaf-like bracts (4 to 10 mm. long): corolla-segments 6 to 10 mm. long: berry 1 to 2 cm. in diameter.—Open bogs and swamps, and wet shores, Newfoundland to north central Maine, Lake Champlain, and western New York, south to West Virginia and Arkansas, mostly east of the Alleghanies and on the coastal plain.

GRAY HERBARIUM.

EXPLANATION OF PLATE 40.—Fig. 1, *Vaccinium Vitis-Idaea*, tip of branch of the larger European form from the Giant Mountains, Silesia; fig. 2, *V. Vitis-Idaea*, var. *minor*, small alpine specimen from White Cap Mountain, Rumford, Maine; fig. 3, *V. Oxycoccus*, tip of flowering branch from Newton, Massachusetts; fig. 4, *V. Oxycoccus*, var. *intermedium*, tip of an original specimen from Klikitat Co., Washington; fig. 5, *V. macrocarpon*, flowering tip from Stony Creek Ponds, New York.

BRYOPHYTES OF THE MT. GREYLOCK REGION,—II.

A. LE ROY ANDREWS.

The observations of another summer upon the bryophytes of the Mt. Greylock region go far to swell its list and clear up some of the obscurities concerning its less common species. More extensive notes upon habit and habitat of these will perhaps not be unwelcome, as bearing, in some slight degree, upon problems of distribution and environment. The species differ, of course, with altitude, and on lower slopes with direction of exposure.

It is possible to distinguish, roughly, three vegetative belts: lower altitudes, from base to perhaps 2200 feet, middle altitudes, from 2200 to 2800, and higher altitudes, from 2800 to 3500 feet, the summit. For the areas that my collections cover, the mountain slopes westwardly into New Ashford, west and northwest into Williamstown, north and northeast into North Adams. A large gorge in Williamstown very near the New Ashford line is known as Goodell Hollow. Farther north in Williamstown an immense, very deep, and composite gorge is not unfittingly termed the Hopper. The configuration of this last feature becomes noticeable even near the summit of the mountain, and, as might be expected, the species of northern range are to be sought here. My exertions of the past summer were largely confined to these gorges and the summit region. Results, as will be seen, were most noticeable in the genera *Amblystegium* and *Hypnum*, while the sphagna proved more diversified and interesting than I had anticipated.

The nomenclature used is again, as far as possible, that of the Manuals. In *Amblystegium* the monograph of Prof. Cheney in *Botanical Gazette* (XXIV, 236, ff.) has been consulted. Comparison has also been made in many cases with the figures in Sullivant's *Icones*, in Braithwaite's *British Moss-flora*, etc. The species follow:

MUSCI.

Amblystegium adnatum, (Hedw.) Aust. On rock in woods, lower slopes of Hopper. The species, which is not uncommon in the vicinity, has a distinct preference for limestone.

Amblystegium chrysophyllum, (Brid.) De Not. (*Hypnum chrysophyl-*

lum, Brid.). Moist ground about base of mountain in New Ashford and Williamstown.

Amblystegium compactum, (C. M.) Aust. Decayed spot in tree, Hopper. This is a species of northern range, occurring in New Brunswick, Ontario, British Columbia, and the Rocky Mountain region. Cheney also records it from New York, Pennsylvania, and Wisconsin. It has not before been reported from New England. It is readily distinguished by its serrate leaves and nearly erect capsule, running down into a narrow collum. I first found it about a large knot hole on a maple tree in the very centre of Williamstown village, where it was associated with *Leskea polycarpa*, Ehrh. and *Anacamptodon splachnoides*, (Fröehl.) Brid., both uncommon species, the latter particularly so.

Amblystegium hispidulum, (Brid.) Grout. (*Hypnum hispidulum*, Brid.) About base of trees in woods. Lower slopes, New Ashford.

Amblystegium irriguum, (Wils.) Br. & Sch. Stones and ground about brooks. Lower altitudes in Williamstown and North Adams.

Amblystegium serpens, (Hedw.) Br. & Sch. Moist ground, lower slopes in Goodell Hollow. Not common.

Anomodon rostratus, (Hedw.) Sch. Moist rocks, near base in New Ashford.

Buxbaumia indusiata, Brid. I am indebted to Dr. G. N. Best for the identification of this specimen, as also for information with regard to its occurrence in New England. The only reference to such occurrence is a statement in Jaeger's *Adumbratio* to the effect that it was collected in the White Mountains by Oakes and distributed, mixed with *B. aphylla*, L. by Sullivant. Since it became known to American bryologists in 1890, it has been found in Idaho, Washington, and in the Catskill and Adirondack regions and about Ithaca, New York, but not hitherto in New England. It is generally a native of mountain regions and even where found is less abundant than the commoner *B. aphylla*. I was unable to find more than the one specimen, which was growing from a decayed spruce log at middle altitude.

Climacium Americanum, Brid. Damp ground in Hopper. Leaves from different parts of the same plant showed very different areolation, it being in some cases typical, in others very short, approaching that of var. *Kindbergii*, R. & C., though the plants were all dendroid.

Cylindrothecium cladorhizans, (Hedw.) Sch. Decayed stump near base of mountain in New Ashford.

Cylindrothecium seductrix, (Hedw.) Sull. About rocks on "Bluffs," middle altitude.

Dicranum flagellare, Hedw. On decayed wood at lower altitudes. Goodell Hollow.

Dicranum fulvum, Hook. Rocks in woods. Middle and lower altitudes in Hopper.

Dicranum scoparium pallidum, L. & J. On ground, lower slopes, Goodell Hollow. This variety, as it occurs here, is generally found in drier, more open places than typical *D. scoparium*.

Dicranum scoparium. A form or variety quite distinct, with long, robust stems, long, acuminate leaves, and very long capsules, sulcate when dry. On wet ground in deep woods, lower slopes, Goodell Hollow. Dr. True recognizes the form as one which he finds in the White Mountains under similar conditions.

Ditrichum vaginans, (Sull.) Hpe. Dr. Best kindly identified this species, which had considerably puzzled me. It occurs beside the carriage road, near the summit, where it is frequently mixed with *Pogonatum capillare*. Dr. Grout, I notice, in his *Mosses with a Hand-lens*, treats it as a plant of southern range in New England. Its occurrence at such an altitude, mixed with a plant of such northern range as *P. capillare*, would suggest the probability that it follows its congener, *D. tortile*. As bearing upon the contention of Austin and Lesquereux about the peristome, it may be interesting to note that the teeth of these specimens were decidedly papillose, supporting Austin's minority view. Limpricht in *Die Laubmoose* states that they are sometimes slightly papillose.

Eurhynchium strigosum, (Hoffm.) Br. & Sch. On ground and stones about brooks at various altitudes. Infrequent or not commonly fruiting.

Fissidens taxifolius, (L.) Hedw. On wet ground near the base, in New Ashford.

Grimmia apocarpa, (L.) Hedw. On rocks in brooks, Goodell Hollow, and wet rock in woods, Hopper.

Hylocomium umbratum, (Ehrh.) Br. & Sch. Thickly carpeting rocks and earth, near summit. Sparingly fruited.

Hypnum cupressiforme, L. Generally on bark of trees or logs. Lower altitudes, Goodell Hollow.

- Hypnum curvifolium*, Hedw. On wet rocks which receive a wash of decayed vegetable matter. Base of mountain in Goodell Hollow.
- Hypnum dilatatum*, Wils. On rocks in brook, middle altitude. Unfruited.
- Hypnum eugyrium*, Sch. On rock by brook, lower altitude, Goodell Hollow.
- Hypnum Haldanianum*, Grev. Earth, decaying vegetable matter, etc. Middle and mostly higher altitudes.
- Hypnum imponens*, Hedw. Decaying logs, generally in lower altitudes. Nowhere in great abundance.
- Hypnum reptile*, Rich. (*H. pallescens*, (Hedw.) Beauv.) Very abundant at all altitudes, on bark of trees, decaying logs, stumps, etc. More robust and pale in color toward summit.
- Plagiothecium silvaticum*, (Huds.) Br. & Sch. On ground and decaying wood at lower altitudes, in Goodell Hollow. Of the three *Plagiotheciums* occurring on the mountain, this species seems to prefer lower altitudes, *P. turfaceum* middle and *P. denticulatum* generally the higher. There is a noticeable difference in the time of ripening of capsule, the order being that of the length of the operculum, beginning with the shortest: *P. turfaceum*, *P. denticulatum*, *P. silvaticum*.
- Pogonatum capillare*, (Rich.) Brid. Mrs. A. M. Smith has called attention to the presence of this species (RHODORA, April, 1902). In New England it is a species of the highest alpine mountain summits, adding one more to the very limited alpine flora of Greylock.
- Racomitrium Sudeticum*, (Funk.) Br. & Sch. Mr. J. M. Holzinger kindly determined this species, which was unfruited. It grew upon the horizontal surface of a rock, near the summit, only the one small tuft being seen. The leaves are unusual in mostly lacking a hyaline point. It is another species of northern or high mountain range, and is probably new to Massachusetts, though occurring in the high mountains of the northern New England States.
- Raphidostegium recurvans*, (Schwaegr.) Jaeg. Very abundant about bases of trees and on decaying wood, at middle and higher altitudes. When sterile simulating the *Hypnums*.
- Rhyncostegium rusciforme*, (Weis) Br. & Sch. On rocks in brooks, at various, especially middle, altitudes.
- Sphagnum cuspidatum*, Ehrh. In wet spot near summit.
- Sphagnum medium*, Limpr. Low-growing, purplish form in similar places.

Sphagnum recurvum, Beauv. (*S. intermedium*, Hoffm. of Manual.)

In similar situations.

Sphagnum rigidum, Sch. In similar situations.

Sphagnum tenerum, (Aust.) Warnst. In similar, more open place.

Distinguished from the closely-related *S. acutifolium* by the involute-pointed stem leaves, fibrillose throughout, with divided utricles, and the narrow pores of the backs of leaves. Hitherto reported only from New Jersey and Connecticut.

Thuidium scitum, (Beauv.) Aust. Stones and base of trees in woods, near base in New Ashford.

HEPATICAÆ.

Aneura latifrons, Lindb. On decayed logs at middle altitude.

Cephalozia curvifolia, Dumort. Rather common on decayed wood at various altitudes. Most abundant and well-fruited at middle altitude with last.

Cephalozia divaricata, Dumort. This species was found in clefts of dry rock at base of mountain, in Hopper.

Cephalozia multiflora, Spruce. On decayed wood at various altitudes. Especially common about the summit, where it occurs mixed with other hepatics and mosses, and generally sterile.

Frullania acolotis, Nees. (*F. riparia*, Hpe.) Bark of tree in Hopper, also on rock in woods of lower slope.

Jungermannia incisa, Schrad. On ground near summit.

Jungermannia Schraderi, Martius. On decayed logs at middle altitudes, with *Cephalozia curvifolia*.

Jungermannia ventricosa, Dicks. With *Dicranum fuscescens* on decayed stumps, just below the summit. The masses of minute bodies borne on the tips of the leaves gave the mat of plants a quite characteristic glaucous-green appearance.

Marsupella emarginata, Dumort. On wet rocks, frequently in brookbeds, at higher altitudes.

Radula complanata, Dumort. On rocks and earth at base of mountain in New Ashford, Williamstown, and North Adams.

Scapania nemorosa, Dumort. On ground and rocks at upper altitudes. The more or less erect plants generally bear dark gemmae at the apex.

Trichocolea tomentella, Dumort. About base of tree in very wet woods, middle altitude.

All of the above mentioned species are represented by herbarium specimens, which are at present with the Herbarium of Williams College in Williamstown.

CAMBRIDGE, MASSACHUSETTS.

REMARKABLE PERSISTENCE OF THE BUTTON BUSH.

WALTER DEANE.

It seems a strange and anomalous condition of things, a perversion of the laws that govern the distribution of plants, to see our common Button-bush (*Cephalanthus occidentalis*, L.) growing in a dry hen-yard behind a barn. Yet such is the case and the shrubs flourish from year to year in this quaint spot, though their natural habitat is swamps and the wet borders of ponds and streams. The story is an interesting one and illustrates well the dogged persistence that some plants show in the hard struggle for life.

The scene is in Shelburne, New Hampshire, on the farm of Mr. A. E. Philbrook. On one part of this farm, as early as 1860, there stood a small pond on whose borders grew in greater or less abundance the Button-bush. The water was shallow and muddy, and in summer the pond was reduced to a very swampy piece of land. Between 1860 and 1865, the owner of the land, in order to make a suitable site for a barn, decided to fill up the pond. To lighten this task a small neighboring stream was turned so as to flow along the foot of a sandy hill close by the pond. The water undermining the bank brought down a good supply of sand, and the pond was finally filled, the level of the ground being about three feet above the former surface of the water. The Button-bush was buried out of sight, for whatever may have been above ground was cut off or trampled down, and on this new land the barn was built and an area left in the rear was used as a wood-yard. Soon sprouts of the buried plants began to appear, but they were continually cut off or trodden under foot until finally the place was turned into a hen-yard and fenced in. Not long after this, the sprouts again appeared and ere long the plants were of normal size, in good condition, and flowering and fruiting regularly, though the roots were buried at least three feet deeper

than when the plants grew beside the pond. The place has been fenced in ever since and used either for hens or pigs or both, and yet through all this time to the present day the plants have continued to thrive.

I first saw this Button-bush on the Philbrook Farm in the summer of 1882. It was growing in a thick clump, some four feet high, the bushes were in full flower and the hens sought shelter from the hot sun under the shady branches. The next time I saw the plants was in October of the present year, fifteen years since my last visit. On repairing to the spot I found the conditions in no wise changed. The little yard was still there, fenced in as formerly. Fifteen little pigs and some hens were roaming about the enclosure. There on one side within a space thirty-three by twenty-eight feet in extent grew the Button-bush. I counted as many as seventy stems rising above the ground which was dry and hard as formerly, and packed closely about the plants by the many feet of the strange companions of these water-loving shrubs. They were from three to seven and one half feet in height, and were setting a good crop of fruit. Mr. Philbrook who has kindly given me the early history of this plant says that the roots are at least six feet below the surface of the ground, but that at that depth the soil is always wet in this particular locality. In this respect only does the plant in any degree follow the normal habit of the species. The shoots of the Button-bush are not so numerous as they were a few years ago, but this is due to the fact that they receive pretty hard treatment from the pigs that root about the stems and rub continually against them. The hens also pick at the young shoots within reach. Still for thirty-seven years under these unnatural conditions have the plants flourished and, if unmolested, there seems to be no reason for putting any limit to their vitality.

CAMBRIDGE, MASSACHUSETTS.

A CRISTATE FORM OF NEPHRODIUM MARGINALE.

F. G. FLOYD.

VERY few of our New England ferns have been found crested. Perhaps this is partially accounted for by the fact that this phase of abnormal growth is a branch of fern study that has not, until quite recently, interested American collectors. That these cristate varie-

ties are not so rare with us as is usually supposed but are simply overlooked I have been led to believe by my observations on bifid and trifid fronds. This latter form of development is quite frequent although not generally considered so. Where I find a species in abundance it is seldom that a careful search fails to disclose at least one frond of this character.

I was on just such a search among *Polypodium vulgare* when my attention was arrested by a peculiar plant of *Nephrodium marginale*, Richard and on closer inspection I found every frond was crested. Evidently the plant was quite young for the fronds were few and of medium size and the crown was small. I was unable, after a careful examination, to detect anything in the environment of the plant that would account for its assuming this peculiarity. It grows, surrounded by its fellows, apparently under similar conditions.

When the plant was discovered the season of 1901 was well advanced, but several of the fronds of previous years persisted about the base showing unmistakably that they were cristate. The station was again visited this year (1902) and another crop of similar fronds found. As the variation appears to be permanent it seems advisable to give the fern formal recognition and I take pleasure in naming it in honor of our well-known pteridologist, Mr. George Edward Davenport.

NEPHRODIUM MARGINALE, Richard, forma **Davenportii**. Fronds similar to those of the species in outline and lobation. The apex and tips of lower pinnae bearing tassel-like enlargements produced by the dividing of the rachis into two or more parts; these being again parted and these segments once or twice cleft, thus forming a series of short, overlapping, crowded and somewhat spreading parts.

The plant was found in Milton, Massachusetts, in an unfrequented part of the Blue Hills Reservation. Specimens are deposited in the Herbarium of the New England Botanical Club, the herbarium of Geo. E. Davenport and in my own herbarium.

WEST ROXBURY, MASSACHUSETTS.

RARE PLANTS IN CENTREVILLE, MASSACHUSETTS.

CLARA IMOGENE CHENEY.

VERBENA HASTATA, forma **rosea**. Habit, stature, foliage, etc., as in the typical form; corolla bright rose-colored.—Centreville, Massachusetts.

On August 18th, 1902, I found this *Verbena* with bright pink flowers instead of the common blue or rarer white ones. The plants were growing in mud on the margin of a lily pool and in the closest proximity to the typical *Verbena hastata*, L., which they strongly resemble. After a most careful examination and comparison of the two forms, no difference was detected excepting in color. The inflorescence, manner of growth, form and texture of the leaves were all alike. I counted sixteen plants of the roseate-flowered form growing in a small space.

CALAMINTHA ACINOS, L. During the summer of 1900 my attention for the first time was attracted to *Calamintha Acinos*, L., which at Centreville has come under my close observation in each succeeding year. The plant has previously been known in New England only from southern Vermont and northwestern Massachusetts. It grows at Centreville in small patches in a dry, sandy soil, with no shade whatever. In close companionship with *Calamintha Acinos* is found *Calamintha Clinopodium*, Benth., from season to season, but less abundantly. According to Gray's Manual of Botany, the latter plant is indigenous from the Great Lakes to the Rocky Mountains. Both of these plants flower in July.

VACCINIUM STAMINEUM, L. This shrub was formerly known in New England only from Berkshire County and the mountains of Hampshire County, Massachusetts, and from Connecticut, but three years ago I found at Centreville a half dozen of these shrubs growing close together in an open, dry, sandy field, on both sides of a cart-road leading to a pond near by. The most vigorous of these was from three to four feet in height, in form compact and most symmetrical. The shrub flowers the last of May or early in June. There seems to be no "off year" for fruit, for the branches yield berries in great abundance each successive season.

Specimens of these plants from Cape Cod have been submitted to the staff of the Herbarium of Harvard University and I am much indebted to Dr. B. L. Robinson and Mr. M. L. Fernald for valuable assistance in the identification.

BOSTON, MASSACHUSETTS.

NOTES ON SOME FERNS OF FRANKLIN COUNTY,
MAINE.

H. W. JEWELL.

Mt. DAY in the towns of Temple and Strong has long been a popular resort for local botanists, but Woods Hill, near Mt. Day and only about half as high, has been less known. On a trip to Woods Hill early in October many ferns were found, among others the following which are of special interest:

Adiantum pedatum, L. Quite plentiful.

Aspidium aculeatum, Swartz, var. *Braunii*, Koch. Three sterile plants were found on Woods Hill; but on the east base of Mt. Day a station of more than forty large finely fruited plants was seen. This is a fine fern with a very distinguished appearance, and I am not aware that it has been previously found in western Maine.

Aspidium Goldianum, Hook. A large station of finely fruited specimens near a brook. The only stations previously known in the state are in the Kennebec Valley.

Cystopteris bulbifera, Bernh. A large station on rocks and on the ground along a brook.

Cystopteris fragilis, Bernh. Only a few poorly fruited plants.

Woodsia Ilvensis, R. Br. Mt. Day.

Aspidium spinulosum, var. *dilatatum* and var. *intermedium* on Mt. Day.

Polypodium vulgare, var. *auritum*, Willd. Since reading in RHODORA for October of Miss Shaw's station for *Polypodium vulgare*, var. *cambricum* I have sent to the Gray Herbarium specimens of a *Polypodium* which grows in three stations on ledges at Farmington, and I am told that the plant is *P. vulgare*, var. *auritum*, which has been known in America only from Essex County, Massachusetts. The fronds are very thin, the margins of most of the pinnae are crenate or undulate, and the lowest pinnae often have next the rachis an elongated lobe.

FARMINGTON MAINE.

CUPHEA PROCUMBENS AT ANDOVER, MASSACHUSETTS. — On the 22nd of September, 1901, I found a plant of *Cuphea* growing at Andover and made a pressed specimen of it. I found the plant in a

rather high, wet pasture, and though I searched the place carefully, could not find another. A part of the specimen was sent to Mr. John Robinson of Salem. It was forwarded later to the Gray Herbarium, where it was determined as *Cuphea procumbens*, Cav., a species of southern Mexico. I am told that the only record of this species from any part of the United States is a note by Dr. J. K. Small in the Bulletin of the Torrey Botanical Club, xxiii. 295 (1896), where it is stated that *Cuphea procumbens* had been collected as a garden escape in Macon County, Georgia, by Mr. A. M. Huger. It is difficult to account for the occurrence of the species in Andover, but the fact of its presence here seems worthy of record. — M. E. GUTTERSON, Andover, Massachusetts.

ERODIUM MOSCHATUM IN CONNECTICUT. — On September 28th the writer found in Hartford some specimens of an unfamiliar plant. Three were gathered and taken home for identification. They proved to be *Erodium moschatum*, L' Her., a species which appears not to have been reported from Connecticut before. The spot was revisited a week later and two more specimens of the *Erodium* were found and still another was discovered at a distance of several rods, thus making six plants in all. Of these, five were found by the side of an old warehouse that has been used for many years for storing paper stock. It is near the railroad and steamboat landing. The soil in which the plants grew is a mixture of ashes, cinders, and such other stuff as would be likely to collect in such a place. The last and smallest plant was rooted in a lump of old cotton that had been trodden down into the ground. From the Gray Herbarium I am informed that *Erodium moschatum* has been found in New England at the following stations: In wool-waste at North Berwick, Maine, by Mr. J. C. Parlin; on waste land in South Boston, Massachusetts, by Messrs. E. and C. E. Faxon; also reported from Lowell, Westford, and Chelmsford, Massachusetts (see Dame & Collins, Flora of Middlesex County), and at Concord, Massachusetts (see Hosmer in RHODORA, i. 223). At all these points the plant has been found on or near mill or warehouse refuse. The species is a native of the Old World but is extensively naturalized on our Pacific coast, whence it has been probably brought to New England in western wool. — H. S. CLARK, Hartford, Connecticut.

AN AMERICAN OCCURRENCE OF THE EUROPEAN *CENTAUREA DIFFUSA*.—As I was riding about a half mile west of the little village of Norfolk, Massachusetts, on July 7th, 1902, in search of *Polygala polygama* and the hoary pea, which grow beside the road in that locality I noticed two peculiar plants. They grew close together near the wheel track on a dry hillside, and were, I think, over a foot tall. I picked two small specimens, but revisited the plants some weeks later and secured larger specimens. On one of these, when kept in water, a white flower came out. A pressed specimen in flower bud was sent to the Gray Herbarium, where it was identified as *Centaurea diffusa*, Lam., a native of the Old World, ranging from Austro-Hungary to Asia Minor. How did these plants reach here?—R. L. MANN, Walpole, Massachusetts.

TWO NEW STATIONS FOR *ARCEUTHOBIUM*.—On October 18 of this year, while passing through a spruce swamp in the northeastern part of Wilmington, Massachusetts, I noticed several spruces covered with 'witches' brooms.' I at once thought of *Arceuthobium pusillum*, Peck, and an examination of some of the trees disclosed abundant plants of this interesting parasite. One week later (October 25) on spruces around a little pond in the southeastern part of Andover, about four miles from the Wilmington locality, I found other spruces with 'witches brooms' and *Arceuthobium*. Except for the station reported by Mr. Jack in RHODORA, ii. 6, and now, as I understand, destroyed by the new Metropolitan Reservoir, this species seems not to have been hitherto reported from Massachusetts.—ARTHUR STANLEY PEASE, Andover, Massachusetts.

NEWLY INTRODUCED SPECIES OF *CREPIS* AND *LEONTODON*.—As compared with the wide distribution and large number of species of *Crepis* and *Leontodon* growing throughout Europe but few species are reported to have found their way to North America. Four species of *Crepis* and three of *Leontodon* comprise the list and of the seven *L. autumnalis*, L. is the only one at all common. In June last the following species of these genera were found growing at Southington, Connecticut, in a small plot of grass land of not over an acre in extent. It is natural to suppose that these plants were introduced

with grass seed when the land was last ploughed and reseeded. Owing to the death of the owner it is impossible to say exactly how long the land has been in turf but it is at least eight years and probably longer since the land was under plough. So far as I have been able to ascertain not one of these three species has before been reported as growing this side of the Atlantic. The occurrence of the three at one station is interesting. Apparently the plants have maintained themselves for at least eight years. They have little opportunity to spread from seed however as the field is mown at too early a date to allow seed to ripen, thus it is probable that whenever the field is again ploughed the plants will disappear.

Crepis taraxacifolia, Thuill. (Growing throughout Europe.) Of this species about twenty plants were found, the plants growing one in a place.

Crepis rigida, W. & K. (Growing in Eastern and Northern Europe and Western Asia.) Only one plant of this species was found.

Leontodon hastilis, L. (Growing throughout Europe and the Orient.) One colony of this species was found comprising ten or a dozen individuals.—C. H. BISSELL, Southington, Connecticut.

ERRATA.

Page 49, line 15; for *junceus* read *juncea*.

" 53, " 32; " Native read Nature.

" 65, " 3; " ROBNISON read ROBINSON.

" 76, " 33; " *Chrysoplenium* read *Chrysosplenium*.

July Number, first page of cover, line 16, for *aurantiacum* read *praealtum*.

Page 158, line 19; for Medical read Médical.

" 158, " 21; " la read ce.

" 158, " 23; " Médecine read Médecine.

" 158, " 29; " le read la.

" 200, " 22; " Island read Swamp.

" 215, " 20; " branches-prostrate read branches prostrate.

" 222, " 15; " scirpoides read scirpoidea.

" 228, " 29; " *chordorhiza* read *chordorrhiza*.

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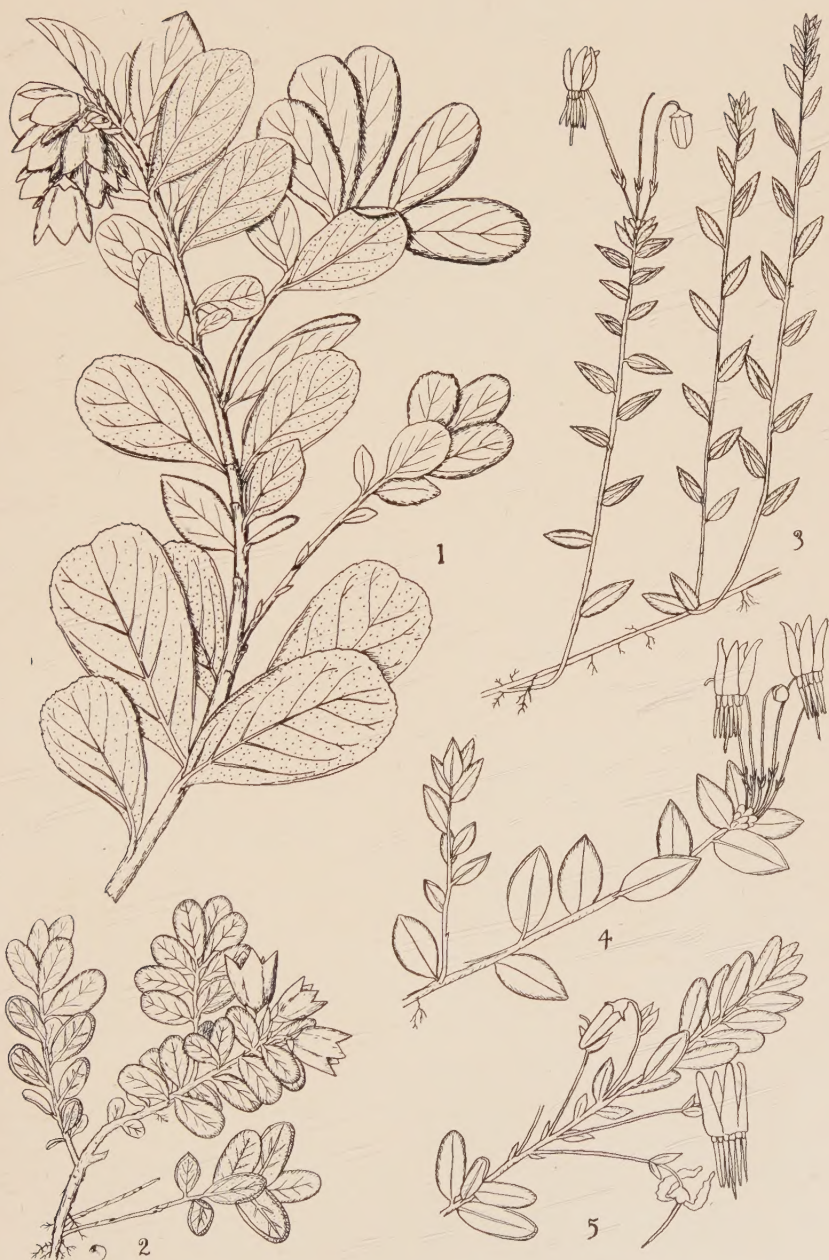


Fig. 1, *Vaccinium Vitis-Idaea*; fig. 2, *V. Vitis-Idaea*, var. *minor*; fig. 3, *V. Oxycoccus*; fig. 4, *V. Oxycoccus*, var. *intermedium*; fig. 5, *V. macrocarpon*.

